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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/816,510

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EXAMINER

HUGHES, SCOTT A

ART UNIT

PAPER NUMBER

3663

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/816,510	Applicant(s) DRAKE ET AL.	
	Examiner Scott A. Hughes	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/12/2007, 10/25/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-26, 28-33 and 43-52 is/are pending in the application.
- 4a) Of the above claim(s) 23 and 43-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21, 22, 24-26 and 28-33 is/are rejected.
- 7) ☒ Claim(s) 52 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 2/12/2007 and 10/25/2006 have been fully considered but they are not persuasive.

Applicant argues that the step of "introducing into the diffuser, before use in water to suppress noise in the marine seismic survey, a chemical additive" in claim 21 is not taught by the Behrens or Zahradnik references. This argument is not persuasive, as the limitation is broadly interpreted as meaning that the chemical additive must be introduced to (interact with) the diffuser before the diffuser is used to suppress noise in water in a marine seismic survey. This limitation does not mean that the chemical must be added to the diffuser before the diffuser is ever used or placed into water, but that the chemical must be added before any time after which the diffuser is used to suppress noise in a marine seismic survey. Therefore, the combination of Behrens and Zahradnik teaches introducing a chemical additive to the diffuser before use in water to suppress noise in a marine seismic survey. Modifying Behrens with Zahradnik, the chemical additive would be introduced to the diffuser before at least a large portion of the time in which the diffuser is used to suppress noise in a survey. This meets the claim limitation since the chemical would be added before use in water to suppress the noise.

Applicant's arguments with respect to claim 22 that the combination of references do not teach allowing the chemical additive to set are not persuasive. The combination

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of references teaches that the chemical additive is added to the water and diffuser before the diffuser is used in suppressing noise. Since the chemical additive would interact with the diffuser and perform its function of suppressing noise by affecting bubble coalescence properties, it is interpreted as meeting the claim limitation that it is "allowed to set" since it is introduced and given time to interact with its environment to influence the bubbles.

Applicant's arguments that there is no motivation to combine the Behrens and Zahradnik references are not persuasive. Applicant argues that the Behrens reference teaches away from using a chemical additive since Behrens teaches a range of bubble sizes and that "relatively large bubbles are preferred." Although Behrens teaches larger bubbles, it is still clear from the disclosure that many bubbles are needed to form the bubble curtain used to suppress noise. Further, Behrens teaches that different sized bubbles are used for different frequencies, and therefore there are times when smaller bubbles would be desired (Column 4). The teachings of Zahradnik of using a chemical additive would help to assure that many separate bubbles are present, and therefore there is a better chance that the curtain of bubbles would be formed.

Applicant's arguments that introducing the chemical additive into the water around the diffuser in the Behrens reference would not be successful are not persuasive. Applicant argues that there is too large an area of water and a moving diffuser for the chemical additive to work. This argument is not persuasive, because Zahradnik teaches introducing the chemical into the liquid solution near the diffuser, and

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such a technique would work in Behrens by introducing the chemical into the area around the diffuser.

Applicant's arguments with respect to claims 28-30 are not persuasive because the hose of Behrens and the hose of Zahradnik are in the water before the chemical would be applied, and are therefore preconditioned by soaking in water as claimed by applicant.

Applicant's arguments against claims 31-33 are not persuasive, as the prior art used is related to the field of chemical influence on bubble size, and therefore is related to the disclosures of Zahradnik.

With respect to applicant's newly added claim 52, mentioned in the arguments as representing a specific embodiment of coating the chemical onto the diffuser, the prior art references do not teach applying the chemical to the diffuser's surface with a brush. The prior art references do not teach a means of applying a chemical additive to a diffuser before use in water by means of a brush. The prior art only teaches mixing additives into to the water in the area of the diffuser.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-22, 24-26, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens (5959938) in view of Zahradnik (Chemical Engineering Science, 1999).

With regard to claim 21, Behrens discloses a method for increasing the rise time of air bubbles emitted from a diffuser in water for the purpose of suppressing noise in a marine seismic survey (abstract; Column 1, Line 60 to Column 2, Line 16; Column 3, Line 45 to Column 4, Line 65; Columns 6-7). Behrens discloses adjusting the apertures that release the bubbles and other variables in order to change the size and concentration of the bubbles to form a bubble curtain to reduce noise in marine seismic surveys, but does not disclose introducing into the diffuser, before use in water to suppress noise in a marine seismic survey, a chemical additive having bubble coalescence retardation properties. Zahradnik teaches that surface active additives are used to hinder bubble coalescence in order to influence bubble size (abstract; Introduction). It would have been obvious to modify Behrens to include using a surface active additive that has bubble coalescence retardation properties as taught by Zahradnik with the bubble diffuser in order to influence the size of the bubbles so that aperture size and orientation do not need to be continuously controlled to obtain certain bubble sizes. The combination of Behrens and Zahradnik teaches introducing a chemical additive to the diffuser before use in water to suppress noise in a marine seismic survey. Modifying Behrens with Zahradnik, the chemical additive would be introduced to the diffuser before at least a large portion of the time in which the diffuser is used to suppress noise in a survey.

With regard to claim 22, Behrens does not disclose that a chemical additive is coated on the diffuser and allowed to set before use in water to suppress noise in the marine seismic survey. Zahradnik teaches that the diffuser is placed into the solution before use (Fig. 1) (Page 4758), and therefore the solution of surface active substances would coat the diffuser before use. It would have been obvious to modify Behrens to include coating the diffuser with surface active additive that has bubble coalescence retardation properties as taught by Zahradnik with the bubble diffuser in order to influence the size of the bubbles so that aperture size and orientation do not need to be continuously controlled to obtain certain bubble sizes. . Since the chemical additive would interact with the diffuser and perform its function of suppressing noise by affecting bubble coalescence properties, it is "allowed to set" since it is introduced and given time to interact with its environment to influence the bubbles.

With regard to claim 24, Behrens discloses adjusting the apertures that release the bubbles and other variables in order to change the size and concentration of the bubbles, but does not disclose introducing into the diffuser a chemical additive having bubble coalescence retardation properties. Zahradnik teaches that surface active additives are used to hinder bubble coalescence in order to influence bubble size (abstract; Introduction). It would have been obvious to modify Behrens to include using a surface active additive that has bubble coalescence retardation properties as taught by Zahradnik with the bubble diffuser in order to influence the size of the bubbles so that aperture size and orientation do not need to be continuously controlled to obtain certain bubble sizes.

With regard to claim 25, Behrens discloses that the diffuser is a perforated hose (Fig. 3) (Column 3, Lines 45-67).

With regard to claim 26, Behrens discloses that the perforated hose is made from a polymeric material (rubber) (Column 2, Lines 55-65).

With regard to claims 28-30, Behrens discloses preconditioning the hose by soaking it in water (Column 23, Lines 55-68). Behrens discloses that the hose expands in the salt water and that the hose has apertures that allow it to produce bubbles while in the water, and therefore it soaked before use in some surveys.

Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens (5959938) in view of Zahradnik (Chemical Engineering Science, 1999) as applied to claims 21-22, 24-25, 26, and 28-30 above and further in view of Cosentino (5863501).

With regard to claims 31-33, Behrens and Zahradnik do not disclose that the chemical additive is a poly block copolymer composed of ethylene oxide and propylene oxide in the form of Pluronic L81. Zahradnik teaches that a surface active agent is used to control bubble coalescence properties from a diffuser, and discloses that the agent can be an ethanol or propanol, but does not disclose the use of Pluronic L81. Cosentino teaches that Pluronics are a surfactant that can be used for bubble coalescence retardation (Column 8; Column 9, Lines 1-38). It would have been obvious to modify Behrens to include a Pluronic as a surfactant that affects air bubble size as

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taught by Zahradnik and Cosentino in order to allow for small air bubbles from the diffuser to block out higher frequency source of noise in the seismic survey.

Allowable Subject Matter

Claim 52 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims (see reasons in Response to Arguments above).

Conclusion

The cited prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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